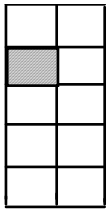
Grid Game # 1

As in the previous examples, we construct a diagram to help answer the questions. The condition *"D and E are on the same shelf"* is naturally symbolized as **D = E**. The condition *"B is on a shelf directly below G"* can be symbolized as **G/B**. The condition *"C is the only item on one of the shelves"* can be symbolized as **C = alone**. The condition *"There is only one item on the fourth shelf"* can be symbolized as **4th = alone**. Finally, the condition *"If a shelf contains only one item, it cannot be directly above or directly below another shelf that contains only one item"* can be symbolized **not 1/1**. This yields the following diagram:

D = E
G/B
C = alone
4th = alone
not 1/1

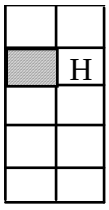


Two readily derived conditions should be noted: There are 10 compartments, 8 items, and C is the only item on its shelf. So two shelves must have only one item each, and no shelf can be empty. Neither of these conditions can be placed on the diagram, so we turn to the questions.

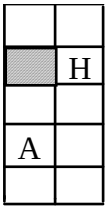
1. If H is on the fourth shelf, which one of the following CANNOT be true?

   (A) A is on the second shelf.
   (B) D and E are on the second shelf.
   (C) D and E are on the top shelf.
   (D) C is on the first shelf.
   (E) A is on the third shelf.

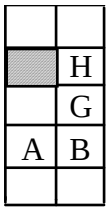
Add the new condition, "H is on the fourth shelf," to the diagram:



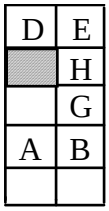
Now we attack the answer-choices, attempting to construct a diagram for each one. The answer-choice for which a valid diagram cannot be constructed will be the answer. Start with choice (A). Place A on the second shelf:



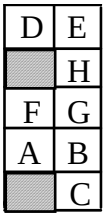
Next, place the condition **G/B** on shelves 2 and 3:



Then, place **D = E** on the top shelf:

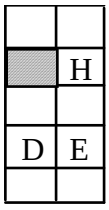


Finally, place C on the bottom shelf and F on the third shelf:



This diagram does not violate any initial condition. Hence, A *can* be on the second shelf. This eliminates choice (A).

Next, attack choice (B). Place the condition **D = E** on the second shelf as follows:



Clearly, this diagram leaves no room to place the condition **G/B**. Hence the answer is (B).

As we work through the remaining questions, note the determining power of the condition of **G/B.**

2. Which one of the following is a complete and accurate list of the items any one of which could be on the top shelf?

   (A) D
   (B) D, E, G, C
   (C) D, E, G, B
   (D) D, E, G, C, F
   (E) D, E, G, H, F, A

The first thing to note about the answer-choices is that they all contain D. So there is no need to check whether D can be on the top—it can. Next, since D and E must be on the same shelf, we eliminate (A). Next, since all remaining choices contain G, there is no need to check whether G can be on the top shelf. Next, since G must be above B, B clearly cannot be on the top shelf. This eliminates choice (C). Finally, C cannot be on the top shelf; if it were, then one shelf with only one item would be directly above another shelf with only one item. This eliminates both (B) and (D). Hence, by process of elimination, the answer is (E).

3. Which one of the following must be true?

   (A) If A is on the third shelf, then E is not on the top shelf.
   (B) If E is on the second shelf, then C is not on the bottom shelf.
   (C) If H is on the fourth shelf, then D and E are not on the second shelf.
   (D) If B is on the fourth shelf, then D is not on the third shelf.
   (E) If G is on the top shelf, then H is not on the bottom shelf**.**

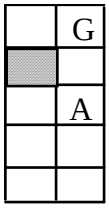
This question is long because it actually contains five distinct questions. During the test, you should save such a question for last. However, there is a shortcut to this particular

question. Notice that answer-choice (C) merely rewords Question 1 and its answer. Hence the answer is (C).

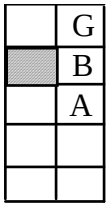
4. If G is on the top shelf and A is on the third shelf, then which one of the following must be true?

(A) D is on the first shelf.
(B) E is on the second shelf.
(C) C is on the fourth shelf.
(D) Either F or H must be on the same shelf as A.
(E) F is on the same shelf as G.

Add the new conditions to the diagram:

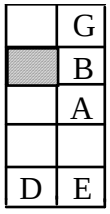


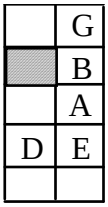
Next, add the condition **G/B** to the diagram:



Now the condition **D = E** can be placed on either the first or second shelf. We construct a separate diagram for each case:

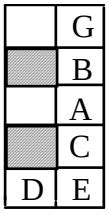
Diagram 1 Diagram 2

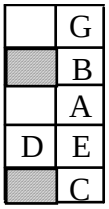




Next, since C must be alone, it must be on the second shelf in Diagram 1 and on the bottom shelf in Diagram 2:

Diagram 1 Diagram 2



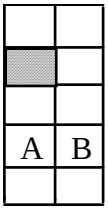


Clearly, in both diagrams, either F or H must be next A. Hence the answer is (D).

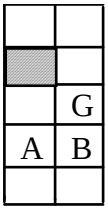
5. If A and B are on the second shelf, which one of the following must be true?

(A) D and E are on the top shelf.
(B) F is on the same shelf as H.
(C) A is directly above F.
(D) C is on the fourth shelf.
(E) C is on the first shelf.

Adding the new condition to the diagram yields

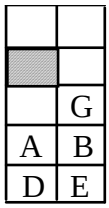


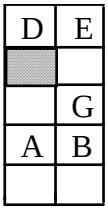
Next, adding the condition **G/B** to the diagram gives



There are two places left for the condition **D = E,** the bottom shelf or the top shelf. We construct a separate diagram for each case.

Diagram 1 Diagram 2



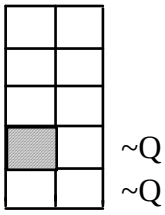


In Diagram 1, the condition **C = alone** must be placed either on the top shelf or the fourth shelf. But in either case this violates the condition that a shelf with only one item cannot be either directly above or directly below another shelf with only one item. This eliminates Diagram 1. In Diagram 2, D and E are on the top shelf. Hence the answer is (A).

Grid Game # 2

This is a hybrid (ordering/grouping) game of medium difficulty. As before, we construct a diagram to help answer the questions. The condition *"J lives on a floor with two apartments"* can be symbolized as **J = 2 apts**. The condition *"K lives on the floor directly above P"* is naturally symbolized as **K/P**. The condition *"The second floor is made up of only one apartment"* can be symbolized as **2d = alone**. The condition *"M and N live on the same floor"* is naturally symbolized as **M = N**. The condition *"O does not live on the same floor as Q"* is naturally symbolized as **O ≠ Q**. The condition *"L lives in the only apartment on her floor"* can be symbolized as **L = alone**. Finally, the condition *"Q does not live on the first or second floor"* is naturally symbolized as **Q ≠ 1st, 2d**. This gives the following schematic:

J,K,L,M,N,O,P,Q
J = 2 apts
K/P
2d = alone
M = N
O ≠ Q
L = alone
Q ≠ 1st, 2d



6. Which one of the following must be true?
   (A) Q lives on the third floor.
   (B) Q lives on the fifth floor.
   (C) L does not live on the fourth floor.
   (D) N does not live on the second floor.
   (E) J lives on the first floor.

From the condition **M = N**, we know that M and N live on the same floor. But there is only one apartment on the second floor, **2d = alone**. Therefore, N cannot live on the second floor. The answer is (D).

7. Which one of the following CANNOT be true?

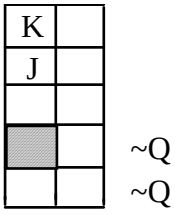
   (A) K lives on the second floor.
   (B) M lives on the first floor.
   (C) N lives on the fourth floor.
   (D) O lives on the third floor.
   (E) P lives on the fifth floor.

From the condition **K/P**, we know that P must live directly below K and thus cannot possibly live on the top floor. The answer is (E).

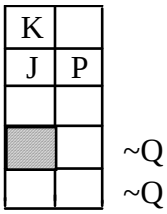
8. If J lives on the fourth floor and K lives on the fifth floor, which one of the following can be true?

   (A) O lives on the first floor.
   (B) Q lives on the fourth floor.
   (C) N lives on the fifth floor.
   (D) L lives on the fourth floor.
   (E) P lives on the third floor.

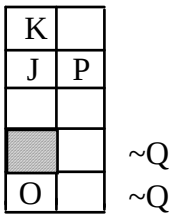
Adding the supplementary conditions to the diagram gives



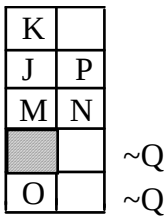
From the condition **K/P**, we know that P must live on the fourth floor:



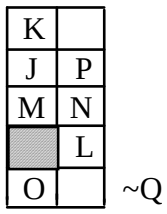
Now we try to construct a valid diagram for each of the answer-choices, starting with (A). Placing O on the bottom floor gives



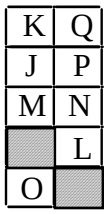
From the condition **M = N**, we see that both M and N must live on the 3d floor:



Now from the condition **L = alone**, we know that L must live on the second floor:



Finally, the condition **O ≠ Q** forces Q to the top floor:

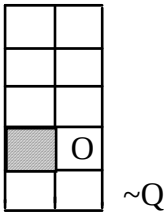


This diagram satisfies all the original and supplementary conditions, so O *can* live on the first floor. The answer is (A).

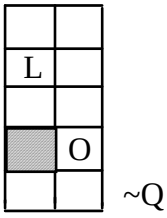
9. If O lives on the second floor, which one of the following CANNOT be true?

   (A) K lives on the fourth floor.
   (B) K lives on the fifth floor.
   (C) L lives on the first floor.
   (D) L lives on the third floor.
   (E) L lives on the fourth floor.

Add the new condition *"O lives on the second floor"* to the diagram:



Now we attack the answer-choices, attempting to construct a diagram for each one. The answer-choice for which a valid diagram cannot be constructed will be the answer. Start with choice (E). Place L on the 4th floor:



Now the condition **K**/**P** must be placed on either the 3d and 4th floors, or the 4th and 5th floors. This generates two diagrams:

Diagram I

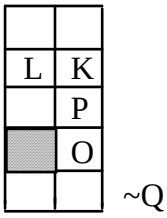
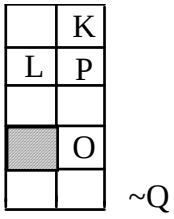


Diagram II



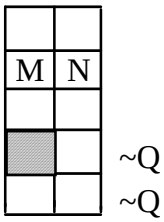
In either diagram, L is on a floor with two apartments, violating the condition **L = alone**. Hence the answer is (E).

Note: We presented the answer directly, instead of applying an indirect proof, because we knew the answer is (E)! These types of problems can be very time consuming; so when you come to them on the test, first scan the answer-choices to see whether you can intuitively pick out the answer (or at least spot a likely candidate). If this fails, then come back to the problem later, if you have time, and apply an indirect proof.

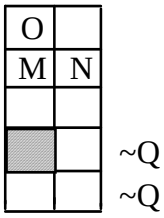
10. If M lives on the fourth floor, which one of the following must be false?

    (A) O lives on the fifth floor.
    (B) J lives on the first floor.
    (C) L lives on the second floor.
    (D) Q lives on the third floor.
    (E) P lives on the first floor.

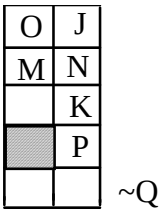
The new condition *"M lives on the fourth floor"* plus the condition **M = N** gives



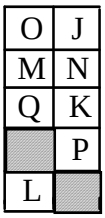
We'll apply an indirect proof. Start with choice (A); place O on the fifth floor:



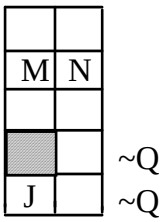
Next, place J on the top floor and the condition **K**/**P** on the 2d and 3d floors:



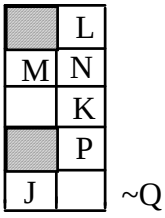
Finally, place Q on the 3d floor, and place L by itself on the bottom floor:



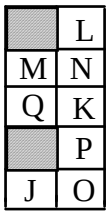
This diagram does not violate any initial condition. Hence, O *can* live on the top floor, which eliminates choice (A). Turning to (B), place J on the first floor:



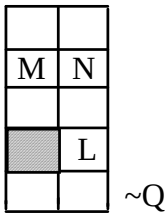
Next, place the condition **K/P** on the 2d and 3d floors, which forces L to the top floor (**L = alone**):



Finally, place O and Q on the 1st and 3d floors, respectively:



This diagram does not violate any initial condition. Hence, J *can* live on the 1st floor, which eliminates choice (B). Turning to (C), place L on the 2d floor:



Clearly, this diagram does not allow for the placement of the condition **K/P**. Hence, L cannot live on the second floor, and the answer is (C).

11. Which one of the following must be true?

    (A) If J lives on the fourth floor, then Q does not live on the fifth floor.
    (B) If O lives on the second floor, then L does not live on the fourth floor.
    (C) If N lives on the fourth floor, then K does not live on the second floor.
    (D) If K lives on the third floor, then O does not live on the fifth floor.
    (E) If P lives on the fourth floor, then M does not live on the third floor.

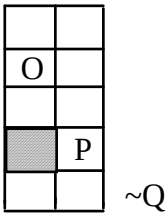
This question is long because it actually contains five distinct questions. During the test, you should save such a question for last. However, if you were alert, you may have noticed that there is a shortcut to this particular question: Notice that answer-choice (B) is merely a rewording of Question

9 and its answer. In Question 9, we learned that if O lives on the second floor, then L cannot live on the fourth floor. This is exactly what choice (B) says. Hence the answer is (B). **Remember, it is not uncommon for the LSAT writers to repeat a question in a different form.**

12. If O lives on the fourth floor and P lives on the second floor, which one of the following must be true?

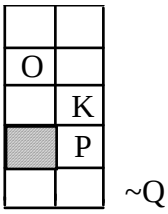
    (A) L lives on the first floor.
    (B) M lives on the third floor.
    (C) Q lives on the third floor.
    (D) N lives on the fifth floor.
    (E) Q lives on the fifth floor.

Add the new conditions to the diagram:



~Q

Next, add the condition **K/P**:



~Q

Now the condition **M = N** can be placed on either the bottom or the top floor. We construct separate diagrams for each case:

Diagram 1

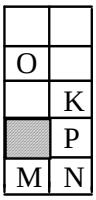
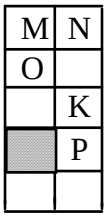


Diagram II



~Q

Next, since L must be alone, she must be on top floor in Diagram 1, and on the bottom floor in Diagram 2:

Diagram 1

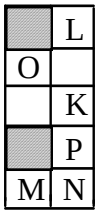
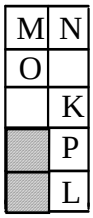


Diagram II



Clearly in both diagrams, the condition **O ≠ Q** forces Q onto the 3d floor. Hence the answer is (C).

<u>Grid Game # 3</u>

We indicate that a teacher does not work at a particular time by placing an X on the elimination grid. Placing the two conditions *"Warren cannot teach on Monday or Thursday"* and *"Warren can teach only evening classes"* on the grid gives

	M	T	W	TH	F	
Warren	X	X	X	X	X	a.m.
	X			X		p.m.
Dornan						a.m.
						p.m.
Novak						a.m.
						p.m.
Emerson						a.m.
						p.m.
Peterson						a.m.
						p.m.

Placing the remaining conditions in like manner gives

	M	T	W	TH	F	
Warren	X	X	X	X	X	a.m.
	X			X		p.m.
Dornan			X			a.m.
			X			p.m.
Novak						a.m.
						p.m.
Emerson	X				X	a.m.
	X				X	p.m.
Peterson						a.m.
	X	X	X	X	X	p.m.

To answer the following questions, we will refer only to the grid, not the original problem.

13. At which one of the following times can Warren, Dornan, and Emerson all be teaching?

    (A) Monday morning
    (B) Friday evening
    (C) Tuesday evening
    (D) Friday morning
    (E) Wednesday morning

The grid clearly shows that all three can work on Tuesday night. The answer is (C).

14. For which day will the dean have to hire a part-time teacher?

    (A) Monday
    (B) Tuesday
    (C) Wednesday
    (D) Thursday
    (E) Friday

Dornan and Novak are the only people who can work Monday evenings, and three classes are always in session, so extra help will be needed for Monday evenings. The answer is (A).

15. Which one of the following must be false?

    (A) Dornan does not work on Tuesday.
    (B) Emerson does not work on Tuesday morning.
    (C) Peterson works on Tuesday.
    (D) Novak works every day of the week except Wednesday.
    (E) Dornan works every day of the week except Wednesday.

The condition *"Dean Peterson cannot teach on Wednesday if Novak teaches on Thursday, and Novak teaches on Thursday if Dean Peterson cannot teach on Wednesday"* can be symbolized as **(P≠W)<—>(N=TH)**. Now, if Novak works every day of the week, except Wednesday, then in particular he works Thursday. So from the condition **(P≠W)<—>(N=TH)**, we know that Dean Peterson cannot work on Wednesday. But from the grid this leaves only Novak and Emerson to teach the three Wednesday morning classes. Hence the answer is (D).

16. If Novak does not work on Thursday, then which one of the following must be true?

    (A) Peterson works Tuesday morning.
    (B) Dornan works Tuesday morning.
    (C) Emerson works on Tuesday.
    (D) Peterson works on Wednesday.
    (E) Warren works on Tuesday morning.

If you remember to think of an *if-and-only-if* statement as an equality, then this will be an easy problem. Negating both sides of the condition

(P≠W)<—>(N=TH)

gives

(P=W)<—>(N≠TH).

This tells us that Dean Peterson must work on Wednesday if Novak does not work on Thursday. The answer, therefore, is (D).

Not all scheduling games lend themselves to an elimination grid. It's sweet when this method can be applied because the answers typically can be read directly from the grid with little thought. Only one-third of the assignment games, however, can be solved this way. Most often the game will require a more functional diagram, and you will need to spend more time tinkering with it.

ANSWERS: Grid Game # 4

17. (A) No. The following diagram satisfies all the conditions and does not have Doctor Yamata lecturing on Monday (L = lecturing, O = operating, T = treating patients, R = conducting research):

	M	T	W	F	S
am	O	T	O	O	R
pm	T	L	L	T	T

(B) Yes. Since *"On Saturday she neither lectures nor performs operations,"* she must lecture either Monday and Tuesday or Tuesday and Wednesday (*She lectures in the afternoon on exactly two consecutive calendar days*). In either case, this has her lecturing on Tuesday.

Caution: She cannot lecture both Wednesday and Friday because they are not consecutive calendar days.

(C) No. The following diagram satisfies all the conditions and does not have Doctor Yamata lecturing on Wednesday:

	M	T	W	F	S
am	T	O	O	O	R
pm	L	L	T	T	T

(D) No. The following diagram satisfies all the conditions and does not have Doctor Yamata lecturing on Friday:

	M	T	W	F	S
am	O	T	O	O	R
pm	T	L	L	T	T

(E) No. This violates the condition *"On Saturday she neither lectures nor performs operations."*

18. (A) No. *"She lectures in the afternoon on exactly two consecutive calendar days"* and *"She treats patients on exactly one morning and exactly three afternoons."* Since her workweek is 5 days long, in the afternoon she can only lecture or treat patients.

(B) No. Suppose she lectures in the morning and treats patients in the afternoon on Wednesday:

	M	T	W	F	S
am			L		
pm			T		

Since *"She performs operations on exactly three mornings,"* and does not operate on Saturdays, the diagram becomes

	M	T	W	F	S
am	O	O	L	O	
pm			T		

However, this violates the condition *"If she operates on Monday, she does not operate on Tuesday."*

(C) Yes. The following diagram satisfies all the conditions and has Doctor Yamata operating Wednesday morning and lecturing Wednesday afternoon:

	M	T	W	F	S
am	O	T	O	O	R

pm	T	L	L	T	T

(D) No. *"She lectures in the afternoon on exactly <u>two</u> consecutive calendar days"* and *"She treats patients on exactly … <u>three</u> afternoons."* Since her workweek is 5 days long, in the afternoon she can only lecture or treat patients.
(E) No. Suppose she treats patients in the morning and in the afternoon on Wednesday:

	M	T	W	F	S
am			T		
pm			T		

Since *"She performs operations on exactly three mornings,"* and does not operate on Saturdays, the diagram becomes

	M	T	W	F	S
am	O	O	T	O	
pm			T		

However, this violates the condition *"If she operates on Monday, she does not operate on Tuesday."*

19. (A) No. The following diagram satisfies all the conditions and does not have her treating patients in both the morning and the afternoon on any day:

	M	T	W	F	S
am	O	T	O	O	R
pm	T	L	L	T	T

(B) No. The following diagram satisfies all the conditions and does not have her conducting research on the same day she lectures:

	M	T	W	F	S
am	O	T	O	O	R
pm	T	L	L	T	T

(C) No. The following diagram satisfies all the conditions and does not have her conducting research on the same day she treats patients:

	M	T	W	F	S
am	R	O	O	O	T
pm	L	L	T	T	T

(D) No. The following diagram satisfies all the conditions and does not have her lecturing on the same day she treats patients:

	M	T	W	F	S
am	R	O	O	O	T
pm	L	L	T	T	T

(E) Yes. *"On Saturday she neither lectures nor performs operations."* Since *"She performs operations on exactly three mornings"* of the remaining four days and *"lectures in the afternoon on exactly two consecutive calendar days,"* she must both operate and lecture on at least one day.

20. (A) No. This violates the condition *"She treats patients on exactly <u>one</u> morning . . ."*
(B) No. This violates the condition *"She treats patients on exactly <u>one</u> morning . . ."*
(C) No. Adding the information to the diagram yields

	M	T	W	F	S
am		O	T		
pm	T		T		T

Clearly, this diagram violates the condition *"She lectures in the afternoon on exactly two consecutive calendar days."*
(D) No. Adding the information to the diagram yields

	M	T	W	F	S
am		O	T		
pm			T	T	T

Adding the conditions *"She performs operations on exactly three mornings"* and *"On Saturday she [does not] perform operations"* yields

	M	T	W	F	S
am	O	O	T	O	
pm			T	T	T

However, this diagram violates the condition, *"If she operates on Monday, she does not operate on Tuesday."*

(E) Yes. Adding the information to the diagram yields

	M	T	W	F	S
am					T
pm			T	T	T

Adding the condition *"She lectures in the afternoon on exactly two consecutive calendar days"* yields

	M	T	W	F	S
am					T
pm	L	L	T	T	T

Now, the remaining schedule must be filled in as follows:

	M	T	W	F	S
am	O	R	O	O	T
pm	L	L	T	T	T

This diagram satisfies all the conditions.

21. (A) No. The following diagram satisfies all the conditions and does not have her treating patients on Monday or Tuesday:

	M	T	W	F	S
am	O	R	O	O	T
pm	L	L	T	T	T

(B) No. The following diagram satisfies all the conditions and does not have her treating patients on Monday:

	M	T	W	F	S
am	R	O	O	O	T
pm	L	L	T	T	T

(C) No. The following diagram satisfies all the conditions and does not have her treating patients on Tuesday:

	M	T	W	F	S
am	R	O	O	O	T
pm	L	L	T	T	T

(D) No. The following diagram satisfies all the conditions and does not have her treating patients on Tuesday:

	M	T	W	F	S
am	R	O	O	O	T
pm	L	L	T	T	T

(E) Yes. Since *"On Saturday she neither lectures nor performs operations,"* she must lecture either Monday and Tuesday or Tuesday and Wednesday (*She lectures in the afternoon on exactly two consecutive calendar days*). She cannot lecture both Wednesday and Friday because they are not consecutive calendar days. Combining this with the condition *"She treats patients on … exactly three afternoons,"* yields the two following diagrams:

Diagram I

	M	T	W	F	S
am					
pm	L	L	T	T	T

Diagram II

	M	T	W	F	S
am					
pm	T	L	L	T	T

Thus, in either case, she treats patients on Friday and Saturday.